

Finding your way in the seeds/agro-chem mergers labyrinth [Ag-Biotech Symposium]
March 31, 2017

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The recently notified mergers in the seed and agro-chem industry raise difficult questions that competition authorities around the world would need to tackle in the following months. Because of the importance of their markets' size, the decision reached by US and EU competition authorities would be particularly significant for the merging parties, but the perspective of a number of other competition authorities in emerging and developing economies, in particular the BRICS, will also play an important role if the transactions are to move forward.

The factors of production segment of the food value chain, which has been the focus of most recent merger activity, has been marked by profound transformations the last three decades. One may note the development of new technologies, starting with deliberate hybridization to marker-assisted breeding and the most recent advances in genetic engineering or genetic editing with CRISPR/Cas technology, as well as the advent of "digital agriculture" and "precision farming". These technologies are of course protected by IP rights consisting of patents, plant variety rights, trademarks, trade secrets, and geographical indications.

These IP rights enable seed companies to prevent farmers from saving seeds of the protected variety, sharing it with their neighbours or selling it informally ("brown bagging"), but also to prevent competing plant breeders from using a protected variety in the development of a new variety (cumulative innovation), as well as to prevent competing seed producers from multiplying and marketing the protected variety without a license or using a protected product name and logos. Seed laws requiring compulsory seed certification with the aim to police seed quality also offer some form of protection to breeders, in the absence of IPRs.

Technology-driven growth has not been the only major transformation of this economic sector. Its consolidation, in particular in the factors of production segment, has been particularly important in recent years.

The consolidation of the factors of production segment

Concentration in the world and EU markets for seeds

In the seeds sector, a number of merger waves, starting in the mid-1980s, have led to the emergence of a relatively concentrated market structure of 6 big players thirty years later (Monsanto, Syngenta, DuPont, BASF, Bayer, and Dow).

The most recent merger wave started in July 2014 when Monsanto made a number of acquisition offers to Syngenta. These offers were rejected, but the Monsanto bid triggered a number of other M&A transactions that were announced in 2015 and 2016 between the various market leaders in the factors of production segment. In November 2015, Syngenta accepted the offer of ChemChina (which owns ADAMA, one of the largest agrochemical companies in the world). In December 2015, Dupont and Dow announced their merger. In September 2016, Bayer put forward a merger deal with Monsanto. During the same month, a deal was announced between two of the leaders in the market for fertilizers, Potash Corp and Agrium. In November 2015, it was reported that Deere & Co. (the leader in agricultural machinery) had agreed to buy Monsanto's precision farming business. This deal was [opposed](#) by the US Department of Justice as it would have led Deere to control a significant part of the already highly concentrated US high-speed precision planting systems market.

The level of concentration varies according to the geographical market and the type of crop. If one looks at the situation in Europe, with regard to the sale of seeds, the market appears to be less concentrated than the global seed market. The picture is also slightly different for certain types of crop. For instance, it is reported that the seed market for sugar beets shows the largest concentration, with the first three companies (CR3) controlling a staggering 79% of the market (HHI: 2444), while for Maize seeds CR3 is 56% (HHI: 1425). High levels of concentration are also [noted](#) in the market for tomato seeds with Monsanto controlling 20% of registered seed varieties. What is more striking, however, is the speed of this consolidation process, as the bulk of this increase in the concentration level of the industry occurred in the last twenty years, the levels of concentration in the mid-1990s being [close](#) to those in 1985.

But the existence of a relatively concentrated market [constitutes](#) the tip of a much bigger consolidation iceberg between the market leaders that takes various forms: joint ventures, various cross-licensing and trait licensing agreements between the "Big Six", distribution agreements, collaborations, research agreements and R&D strategic alliances, patent litigation settlements, to which one may add the recently concluded post-patent genetic trait agreements. Furthermore, one may not [exclude](#) the possibility of consolidation by stealth, in view of the important growth in common ownership in various sectors of the economy, as institutional investors simultaneously hold large blocks of other same-industry firms.

Which concentration level will be considered for merger purposes?

Market structure and concentration is, of course, just one step in the assessment of mergers and should be followed by a more thorough analysis of the possible anticompetitive effects

and efficiencies, if the level of concentration resulting from the merger raises concerns. While the EU market for seeds could not be characterized as highly concentrated before this most recent merger wave, if one applies the conventional HHI measure, it remains possible that if the mergers first notified to the European Commission are approved without conditions with regard to seed markets, the concentration level that the Commission will consider when assessing the following notified merger will respectively increase. One may project that, as the Dow/Dupont merger has been recently cleared without conditions relating to the seed industry, it will be more difficult for the ChemChina/Syngenta merger to be approved without conditions, and even more so for the Bayer/Monsanto merger that will be the last one examined. Indeed, as the Commission made clear in its [press release](#) announcing its decision on the Dow/Dupont transaction,

The Commission examines each case on its own merits. In line with its case practice, the Commission assesses parallel transactions according to the so-called “priority rule” – first come, first served. The assessment of the merger between Dow and DuPont has been based on the *currently prevailing market situation*.

The assessment as to whether a merger would give rise to a Significant Impediment of Effective Competition (SIEC) is [based on](#) a counterfactual analysis where the post-merger scenario is compared to a hypothetical scenario absent the merger in question. The latter is [normally taken](#) to be the same as the situation before the merger is consummated. However, the Commission may take into account future changes to the market that can “reasonably be foreseen”. The identification of the proper counterfactual can be complicated by the fact that there can be more than one merger occurring in parallel in the same relevant market. Under the mandatory notification regime, the Commission [does not factor](#) into the counterfactual analysis a merger notified after the one under assessment. On the basis of the identified counterfactual, the Commission then [proceeds](#) with the definition of the relevant product and geographic market. That means that when assessing the Dow/Dupont merger, the Commission did not take into account the (future) market situation that would result from the notified merger between ChemChina and Syngenta, which was a known fact during the period of the assessment of the Dow/Dupont merger, as this was notified a few months after the notification of the Dow/Dupont transaction.

Explaining concentration levels

The consolidation of the industry may be explained by various factors at play. One may put forward a “natural” causes explanation, in view of the existence of endogenous sunk costs that may lead to a reduction in the number of firms active in this industry. John Sutton has famously [argued](#) that high concentration may persist in many manufacturing industries, even in the presence of a substantial increase in demand and output, when firms in the industry decide to incur, in addition to “exogenous sunk costs”, that is the costs that any firm will have to incur upon entry into the market, “endogenous sunk costs”, which include

cost for R&D and other process innovations, with the aim to increase their price-cost margin. If all firms invest in endogenous sunk costs, in the long run this investment will produce little or no profit, as the competitive advantage gained by each firm's investment will be largely ineffective if all other firms make a similar investment. This may lead to a fall in the industry's profitability in the long-term and to a concentrated market. The recent consolidation movement in the industry may also be understood as a way to deal with externalities arising out of the expansion of the IP protection in recent decades.

Consolidation may also occur because of the merging companies' quest for market share by purchasing potential competition, acquiring local market leaders or companies with diversified distribution networks and an established customer base. Market leaders may also [strive](#) to constitute one-stop shop platforms for farmers, combining an offering of seeds, traits, and chemicals, that would enhance the farmers' technological dependence vis-à-vis large agrochemical and seed companies.

These large agro-chem groups forming a tight oligopoly will be able to [exploit](#) eventual network effects that may result from the shift towards data-driven agriculture and to block new entry in the factors of production markets. It is increasingly clear that market players in this industry have made the [choice](#) of positioning themselves as fully integrated providers, or the orchestrators/partners of an established network, offering a package of genetic transformation technology and genomics, traits, seeds, and chemicals. One may [argue](#) that this package of 'complementary' products and technologies may form a system competing with other systems ('systems competition'). A question that would need to be tackled, when assessing the plausibility of the "system competition" thesis, would be to determine the existence of distinct relevant markets affected by the mergers. Could research, breeding and development/marketing of the various kinds of seeds be considered as part of the same or of different relevant markets? I address this question and the effects of these mergers on output, prices, and consumer choice in more detail in a separate paper (I. Lianos & D. Katalevsky, *Merger Activity in the Factors of Production Segments of the Food Value Chain: A Critical Assessment* (forthcoming)).

Theories and assessment of harm to innovation

Because of space constraints, I will only focus here on the assessment of the possible effects of these mergers on innovation. The emergence of integrated technology/traits/seeds/chemicals platforms may place barriers to new entry, as companies wishing to enter the market(s) would need to offer an integrated solution to farmers. This may stifle disruptive innovation if, in the absence of the merger, firms were able to enter one or two segments of the market (e.g. research and breeding) without the need to offer an "integrated" platform product. One should also take note of the fact that although traditional breeding methods required important resources and a considerable investment of time (because of long breeding cycles) and thus provided large economies of scale leading to the emergence of large market players, the latest genome-editing technologies, particularly CRISPR/Cas, may constitute more efficient and less resource intensive and time-consuming breeding methods, that offer opportunities for the emergence of more

competitive and less integrated market structures in the traits/seeds segment(s).

Assessing the effects on innovation will be a crucial part of the merger assessment, for the European Commission as well as for all other competition authorities with jurisdiction to examine the specific merger(s). It is true that the EU market is mainly a conventional seed market, and not a GM seeds market, but it is also clear that all of the Big Six have an integrated strategy for R&D for all types of crops, working on “traditional” marker-assisted breeding, or the more recent forms of predictive breeding that have become commercially possible with the reduction of the cost of genome sequencing and the use of IT, but also on genetically engineered seeds. Assessing the possible effects of each merger on innovation will be a quite complex exercise in view of the need to focus not only on existing technologies but also on the possibility of new technologies emerging in the future.

Competition authorities may use different methodologies to assess these future effects: the definition of innovation markets as it is the case in the US, or a more general assessment of the existence of an effect on innovation constituting a SIEC in Europe. In its recent decision on the *Dow/Dupont* merger, the European Commission found that the merger may have reduced innovation competition for pesticides by looking to the ability and the incentive of the parties to innovate. The Commission emphasised that this analysis was not general but was based on “specific evidence that the merged entity would have lower incentives and a lower ability to innovate than Dow and DuPont separately” and “that the merged entity would have cut back on the amount they spent on developing innovative products”. That said, the Commission also [mentioned](#) the following, which I think may be of relevance to the competition assessment of the other pending mergers:

Only five companies (BASF, Bayer, Syngenta and the merging parties) are globally active throughout the entire R&D process, from discovery of new active ingredients (molecules producing the desired biological effect), their development, testing and regulatory registration, to the manufacture and sale of final formulated products through national distribution channels. Other competitors have no or more limited R&D capabilities (e.g. as regards geographic focus or product range). After the merger, only three global integrated players would remain to compete with the merged company, in an industry with very high barriers to entry. The number of players active in specific innovation areas would be even lower than at the overall industry level.

This type of assessment looks close to the filter of the existence of at least four independent technologies that constitute a commercially viable alternative, in addition to the licensed technology controlled by the parties to the agreement, that the Commission usually employs in its [Transfer of Technology Guidelines](#) in order to exclude the possibility that a licensing agreement may restrict competition and thus infringe Article 101 TFEU. There is no reason why the Commission would apply a different approach in the context of merger control. The above indicate that the Commission may view more negatively mergers that lead to less

than four or three independent technologies in the relevant market(s).

Hidden/Not usually considered social costs

One may also assess the mergers in the seeds and agro-chem market from a public interest perspective, in view of the broader concerns animating public policy in this context and the existence of a nexus of [international commitments](#) with regard to biodiversity, sustainability, the right to food, as well as the emphasis put by some competition law regimes on public interest analysis (e.g. South Africa). The aim will be to assess the full social costs of these transactions, to the extent, of course, this is practically possible. This may be more achievable in merger control regimes where it is not courts that make the final decisions to clear, or not to clear, the merger, as there may be limits to the adjudication of certain broader public interest concerns, but integrated competition law agencies, or branches of the executive power, as it is formally the case in the EU.

Although public interest considerations do not form part of the substantive test of EU merger control, Article 21(4) EUMR includes a legitimate interest clause, which provides that Member States may take appropriate measures to protect three specified legitimate interests: public security, plurality of the media and prudential rules, and other unspecified public interests that are recognised by the Commission after notification by the Member State. If a Member State wishes to claim an additional legitimate interest, other than the ones listed above, it shall communicate this to the Commission. And the Commission must then decide, within 25 working days, whether the additional interest is compatible with EU law, and qualifies as an article 21(4) legitimate interest. This should not be excluded a priori, in particular in view of the importance of biodiversity, environmental protection, and employment in the [EU treaties](#) as well as broader international commitments to the right to food.

Food production is, of course, an area of great economic and geopolitical importance. According to UN estimates, by 2050 the world population will increase to nine billion, and catering to this additional demand would require an increase of 70% more food. This puts a strong pressure to increase output, which intensifies even more environmental impact, given increasing sustainability challenges (degradation of soil and reduction of arable land due to urban sprawl, water scarcity, biofuel consumption, climate change, etc.). Food security becomes an increasingly important issue on the agenda of the developing world.

The projected mergers in the seed and agro-chem industry will greatly affect the future control of food production and innovation in order to improve yields and feed the world. One may ask if such important decisions should be based on a narrowly confined test that mostly focuses on effects on output, price and to a certain extent innovation, or if one should adopt a broader consideration of the full social costs of such transactions, to the extent that these may be assessed and eventually quantified.

This may have the additional benefit to enable the participation in the merger process as third parties of a number of NGOs representing broader citizens' interests in environmental

protection and biodiversity, which is currently impossible with the quite narrow procedural requirements for third party intervenors in EU merger control (as the test for admission as third party intervenors is usually met only by competitors, suppliers, and customers). I think that all the affected interests and stakeholders should be offered an opportunity to participate in the decision-making process, thus increasing its efficiency (if one takes a [participation-centred approach](#)) and legitimacy, in particular for matters of major social importance as is the control of the global food supply chain(s).

It may be argued, if one takes a pessimistic, Malthusian perspective, that we are doomed to face famine and malnutrition, unless considerable amounts of investment are made in R&D in this sector. In view of the fall of public investments and the important role private investments have played in this [area](#), one may argue that higher levels of consolidation in the sector could lead to higher profitability (at the expense of farmers) without necessarily leading to immediate effects on food prices, as the farming segment is driven by atomistic competition in most markets, and therefore farmers will not have the ability to pass on, at least in the short term, the eventual overcharges to the final consumers. Of course, such an approach may not factor in the effects of these mergers to the livelihood of around half a billion farmers in the world and their families, most of whom do not benefit from subsidies guaranteeing an acceptable standard of living.

It also assumes that higher profitability would lead to higher investments in R&D, a claim that has been recently questioned by [research](#) indicating that large firms prefer to retain earnings and distribute them to shareholders and the management rather than invest them in R&D. But, more generally, a simple question that one may ask is “are the projected mergers *necessary* in order to promote innovation in this sector”? Answering this question may bring a great sense of clarity as to the various dimensions of these mergers competition authorities would need to take into account. And the burden of proof to provide a convincing answer to this question remains on the notifying parties!

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